

REMARKS

The specification has been amended at page 6 to correctly indicate that lifting eyes are provided for lifting each bearing bracket 9, rather than the bearing support ring 11. See Figure 3 of the drawings which indicate that the bearing support ring 11 is welded to the moonpool tube 13, but the lifting eyes 8 are used to lift bracket 9 when attachment device 10 is unlocked.

Claims 1, 2, and 4 were rejected under § 103(a) as obvious over Carlsen '553. The examiner states that '553 discloses the claimed invention except that the bearings and bearing surface are reversed. Apparently the examiner is referring to Carlsen's "*emergency bearing 22 comprising resilient buffer members 22(a) (for example made from rubber) mounted on the outer wall of the skirt (13) and annular members 22(B) (for example made from steel) mounted on an adjacent cylindrical wall of the hull (14).*" Notice that Carlsen's arrangement 22 is not a sliding radial bearing at all. It is a bumper (like tires between a vessel and a dock) to prevent damage when the skirt 13 is forced against the moonpool in hull 14. Carlsen's sliding radial bearing is provided at 21, 38 at the top end of the turret or rig 11, 12.

Applicants' turret mooring arrangement defined in Claim 1 has been amended to indicate that a sliding radial bearing is being claimed in a turret mooring arrangement which includes an axial bearing and a radial bearing in which a radial gap exists between a bearing surface ring (4) on the turret and low friction material surfaces on the pads. Carlsen's resilient buffer members 22a are not the same as Applicants' low friction pads (5) which are arranged and designed to slide against a bearing surface ring (4). Carlsen's rubber (for example) bumpers may absorb shocks of the turret (12) banging into the hull 14, but will not function as a sliding radial bearing. A routineer in the mooring art would not turn to Carlsen's emergency bearing arrangement when providing a sliding radial bearing.

Claim 1 has been further amended to make clear that the invention defined by that claim has a radial sliding bearing with a predetermined clearance between the sliding surfaces under normal conditions. Only under severe sea conditions does contact occur and heaving sliding action take place between the pads (5) and the bearing surface ring.

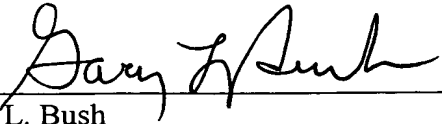
Claim 5 has been rejected as obvious over Carlsen in view of Stafford and in view of Pollack '197. The examiner states that a bracket 244 is removable. Applicants' Claim 5 indicates that its radial gap (7) and a releasable attachment device enables removing of a selected pad (5) and replacing it while the vessel remains moored at an offshore location. Pollack's arrangement (see Figure 12) does not show a gap between ring 242 and pads 240. Accordingly, it would be practically impossible to remove the pads 240 while a vessel is moored because of the contact and friction between the ring and the pads. Accordingly, a routineer would not find Pollack's arrangement of his Figure 12 useful in providing an arrangement like Applicants' whereby a pad can be removed while the vessel is moored at sea. Claims 1 through 5 as amended patentably define over the cited references.

Claim 6 has been amended to define Applicants' invention in terms of a rotational support arrangement for a turret and vessel where only a single axial bearing arrangement is provided and only a single radial bearing arrangement is mounted between a turret lower end and a lower end of a moonpool shaft. Claim 6 as amended, also includes limitations to a low friction pad surface radially spaced by a predetermined clearance from a ring at all times except under severe sea conditions, and further patentably defines over Carlsen or any art of record.

Claim 8, defining a method for replacing the pads while the vessel is moored at sea defines patentably over Carlsen, Stafford, and Pollack's '197 for the same reasons as presented above for Claim 5.

Applicants' respectfully request allowance of Claims 1-8 in view of the amendments to the claims and the arguments presented above.

Respectfully submitted,

By: 
Gary L. Bush
Attorney for Applicants
Reg. No. 27,423

Andrews Kurth LLP
600 Travis, Suite 4200
Houston, Texas 77002
Office: 713/220-4726
Facsimile: 713/220-4285
Customer No. 23,444

Date: Feb. 7 2005

Re

REPLACEMENT PAGE

Low friction material 5 is attached to bearing bracket 9 by fasteners 6. Bearing brackets 9 are segments disposed outwardly and spaced around bearing surface ring 4. Attachment device 10 locks each bearing bracket 9 to bearing support ring 11. Lifting eyes 8 are provided for lifting each ~~attachment 10 and bearing support ring 11~~ bearing bracket 9. Bearing support ring 11 is rigidly attached, preferably by welding, to hull bracing 12 outside of moonpool tube 13. Inside radius 20 is gas flame cut and hand trimmed within a suitable radial accuracy of about ± 3 to 5 millimeters deviation from a true circle.

A sufficient thickness, such as from 25 to 60 millimeters, of low friction material 5 provides a wear allowance to compensate for small variances in radial position of lower bearing units 14 in addition to normal wear incurred over the service life of mooring turret 16.

Each bearing low friction material pad 5 and bearing bracket 9 can be removed from bearing support ring 11 while the turret is secured to a sea bottom by anchor legs 21. The procedure is enabled because of the presence of gap 7. The attachment device 10 is released from bearing support ring 11, and the pad and bearing bracket 9 is lifted with lifting eyes 8 such that attached pad 5 and bearing bracket 9 are lifted together above ring 11. A worn pad 5 can be removed at that point by removing fasteners 9. A new pad 5 can be substituted for a worn pad. The bracket 9 and new pad 5 are then lowered by lifting eye 8, and the attachment device 10 secures the bearing members 5 and 9 again to bearing support ring 11.